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10/643,597	08/19/2003	Walter H. Whitlock	M02A454	3964
20411	7590	07/14/2006	EXAMINER	
THE BOC GROUP, INC. 575 MOUNTAIN AVENUE MURRAY HILL, NJ 07974-2064			EL ARINI, ZEINAB	
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1746

DATE MAILED: 07/14/2006

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/643,597  
Filing Date: August 19, 2003  
Appellant(s): WHITLOCK, WALTER H.

**MAILED**

JUL 14 2006

**GROUP 1700**

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David Hey  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 06/13/06 appealing from the Office action  
mailed 04/12/06.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**WITHDRAWN REJECTIONS**

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the examiner. The rejection under 35 U.S.C. 112, second paragraph, stated in paper No. 010606 has been withdrawn.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

US 2002/0112747	De YOUNG et al.	08-2002
6,612,818	NISHIO	09-2003
6,085,762	BARTON	07-2000
6,076,557	CARNEY	06-2000

***Specification***

The amendment to the specification, filed 05/02/06 is non-compliant amendment, because complete paragraphs including the amendment on pages 4 and 11 have not been provided.

**(9) NEW GROUND(S) OF REJECTION**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 103***

1. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over De YOUNG et al. (US 2002/0112747) in view of Nishio (6,612,818), and as further evidenced by Carney (US 6,076,557).

De YOUNG et al. disclose a process and apparatus for cleaning a semiconductor wafer using dense phase carbon dioxide. Dense carbon dioxide is stored in a high-pressure vessel (I) (50) (at pressure between 300 and 5000 psi), the wafer is loaded into a cleaning chamber (III)(51). Cleaning chamber (III) is pressurized with clean

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carbon dioxide from either a bulk storage tank through valve (i)(55) or from pressure vessel (l)(50) through valve (a)(56) to a pressure of between 300 psi and 5000 psi. Highly filtered chemical adjuncts are added to the cleaning chamber from adjunct addition module (VI)(61) through valve (b)(62) during addition of dense CO<sub>2</sub> or alternatively prior to the addition of dense CO<sub>2</sub>. The reference discloses conveying a dense gas component and a liquid component to a vessel, applying an elevated pressure to said vessel, and contacting said component with the surface of the wafer. The reference discloses the dense component and the liquid component (isopropyl alcohol), the pressure, and the mixing steps as claimed. See paragraphs 40-41, 48-54 and 63, and Fig. 4.

De YOUNG et al. do not teach using a bellows accumulator as claimed.

Nishio discloses a bellows type pump or accumulator for transporting chemical liquid in various process such as washing surfaces of liquid crystal display devices in semiconductor producing apparatus. See col. 1, lines 14-46, and col. 2, lines 6-18. Nishio also discloses at col. 3, line 3, "Fig. 15 is an operation diagram of the case where the fluid pressure in the bellows of the accumulator is raised", and also at col. 12, lines 36-40 "the compressed air is supplied into the air chamber 32 through the air supply port 39 to raise the filling pressure in the air chamber 32. In accordance with the rise of the filling pressure in the air chamber 32, the bellows 29 is contracted". Nishio does not teach the range of the pressure, but he discloses an automatic pressure adjusting mechanism of the accumulator (fig. 7), col. 6, lines 38-50.

It would have been obvious for one skilled in the art to use the accumulator taught by Nishio instead of the pressure vessel taught by De YOUNG et al. to obtain the claimed process and system, and to improve the cleaning process. This is because both accumulator and pressure vessel used to elevate the pressure of the cleaning component. The Nishio' accumulator being capable of use at elevated pressure, because Nishio indicates that compressed air is used to elevate the pressures in the bellows and thus suggest that bellows accumulator can be used at elevated/higher

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pressure. As evidentiary teaching by Carney (6,076,557), where stated that "diaphragm type accumulators are typically suited only for relatively low pressure applications when constructed of metal and somewhat higher pressure applications (5000 psi) when constructed of rubber", see col. 1, line 66-col. 2, line 2, col. 2, lines 45-60, and col. 20, lines 9-19, see also col. 3, line 65- col. 4, line 11, it would be obvious for one skilled in the art to use the accumulator taught by Nishio instead of the pressure vessel taught by De YOUNG et al. to obtain the claimed process and system, and to improve the cleaning process.

It would have been obvious for one skilled in the art to adjust the flow rate to obtain the component velocity as claimed. This is because by increasing the pressure of the cleaning fluid, the flow rate of the cleaning fluid will increase, and therefore enhance the cleaning process.

2. Claims 1-2, 5, 8-19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barton (6,085,762) in view of Nishio), and as further evidenced by Carney (US 6,076,557).

Barton discloses a process and system for cleaning a surface of a semiconductor wafer. The reference discloses conveying a component comprises a dense gas component, a liquid component, and a mixture thereof to a tank, applying an elevated pressure to said tank, contacting the component with a surface of semiconductor wafer. The reference discloses the dense gas, the mixing process , and the pressure as

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claimed. See col. 3, lines 39- 67, col. 4, lines 51-55, col. 5, lines 18-21, col. 7, lines 46-62, col. 8, lines 2-5, 11-20, 29-54, col. 12, lines 1-15, the claims and Fig. 1.

Barton does not teach the bellows accumulator as claimed.

Nishio as discussed supra discloses the bellows accumulator as claimed.

It would have been obvious for one skilled in the art to use the accumulator taught by Nishio instead of the ballast tank taught by Barton to obtain the claimed process and system, and to improve the cleaning process. Simply alternating choice of tank because Barton discloses that to render the process as continuously efficient as possible by providing a ready source of pressurized fluid at any time needs this. Furthermore, as evidentiary teaching by Carney (6,076,557), where stated that "diaphragm type accumulators are typically suited only for relatively low pressure applications when constructed of metal and somewhat higher pressure applications (5000 psi) when constructed of rubber", see col. 1, line 66-col. 2, line 2, col. 2, lines 45-60, and col. 20, lines 9-19, see also col. 3, line 65- col. 4, line 11, it would be obvious for one skilled in the art to use the accumulator taught by Nishio instead of the ballast tank taught by Barton to obtain the claimed process and system, and to improve the cleaning process.

#### **(10) Response to Argument**

Appellant's arguments filed 10/28/05 have been fully considered but they are not persuasive. Appellant's argument with respect to Nishio does not disclose applying an elevated pressure to the bellows is unpersuasive, because one skilled in the art would use pressure to discharge the liquid from the bellows towards the surface to be cleaned.

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The Nishio' accumulator being capable of use in high pressure, because Nishio indicates that compressed air is used to elevate the pressures in the bellows and thus suggest that bellows accumulator can be used at elevated/higher pressure.

Furthermore, as evidentiary teaching, See Carney (6,076,557), where stated that "diaphragm type accumulators are typically suited only for relatively low pressure applications when constructed of metal and somewhat higher pressure applications (5000 psi) when constructed of rubber", see col. 1, line 66-col. 2, line 2, col. 2, lines 45-60, and col. 20, lines 9-19, see also col. 3, line 65- col. 4, line 11. Thus, it would have been clear to one of ordinary skill in the art that the bellows accumulator of Nishio would be capable and readily useful in high pressure systems and application, contrary to appellant's arguments.

It would have been obvious for one skilled in the art to adjust the pressure in Nishio by using pressure-regulating mechanism. See Nishio'818, col. 4, lines 5-14, col. 12, lines 22-50. This is also because the pressure as claimed (elevated pressure) could read on pressurizing the bellow to discharge the liquid toward the surface to be treated. This is also because all references are from the same technical endeavor, which is using densified (e.g liquid or supercritical) carbon dioxide cleaning composition for cleaning a surface of a substrate under pressure.



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**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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